

MONTHLY JOURNAL OF
THE MUSHROOM GROWERS'
ASSOCIATION

MGA

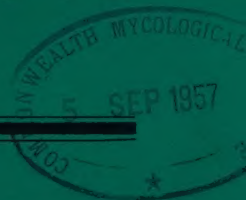
BULLETIN

SEPTEMBER, 1957

NUMBER 93

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**MUSHROOM DEVELOPMENTS CONFERENCE
SOUTHPORT, 2ND & 3RD OCTOBER**

SENSE AND SENSIBILITY

The ENGLISH SPAWN MAKER

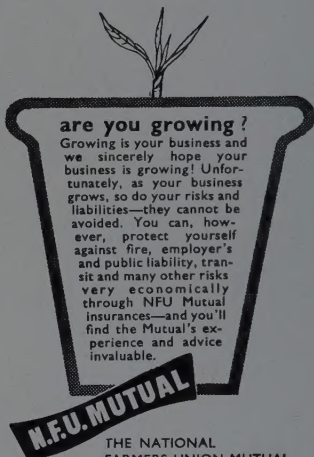
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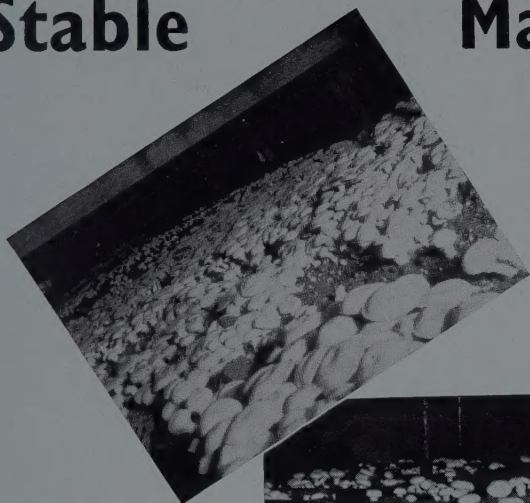
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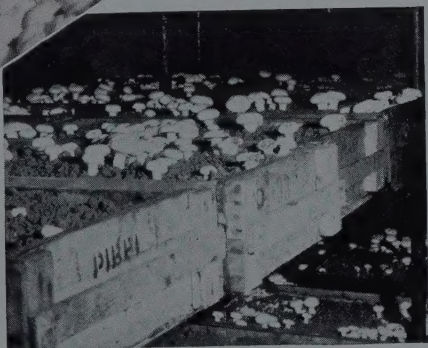
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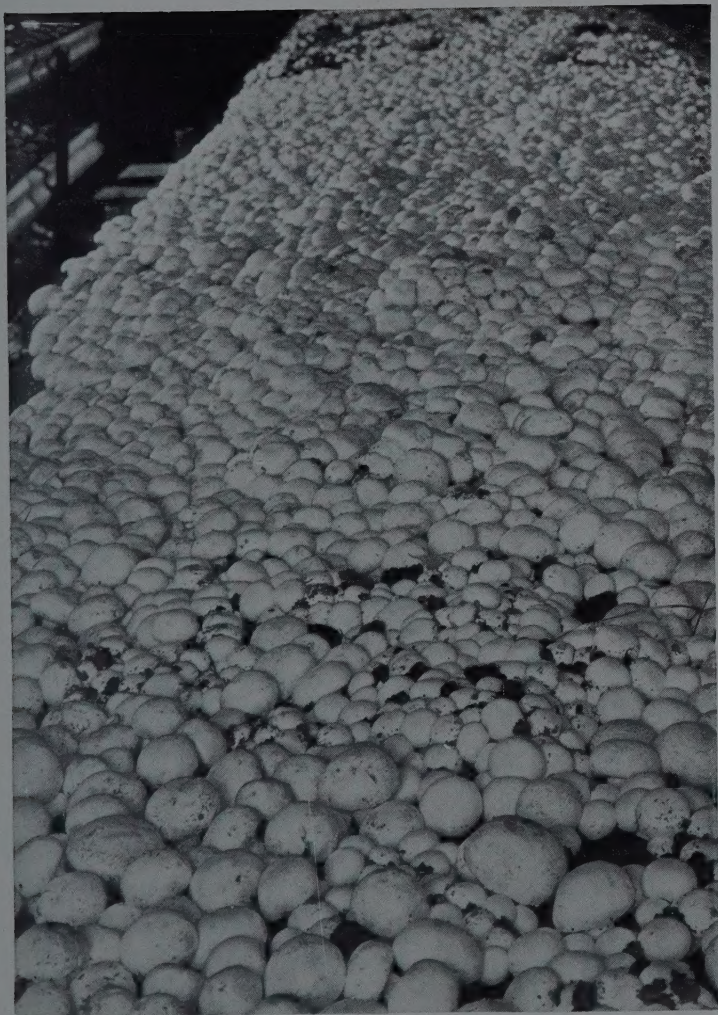
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EDITORIAL

SOUTHPORT, 1957

Five years have gone by since the last MGA Refresher Course, held at Peterborough, and few will disagree that the time had come for a repeat performance.

From time to time, where mushroom growers forgather, references have been made to this Peterborough gathering and the call for a repeat, whilst not being perhaps a clamour, has nevertheless been insistent.

Southport's Mushroom Developments Conference next month takes the place of the Annual Mushroom Industry Exhibition and Conference which had, in a short space of time, made quite a niche for itself in the affairs of the mushroom industry of this country. It is not easy to make a change such as this, as most of us find from time to time in our own lives, but changes have to be made, in organisations and in individual lives. Changes, without doubt, invariably make for progress—that more often than not is their purpose.

This Southport Conference, with its very full programme and its provision for open discussion will, we hope, attract a large attendance, not only from growers in these islands but from places overseas.

It is by lectures and discussions with the attendant exchanging of ideas that further light is let into this industry and, with that light comes increased knowledge and further steps forward to more efficient production.

At Southport each and every delegate will have a chance to look, listen, to learn and, if he so wishes, to make his own contribution. The lectures and discussions will cover a wide field and within that field may well lie the key to the extra $\frac{1}{4}$ lb. per sq. ft. per crop, that elusive "little extra" which baffles even the most competent growers.

The answers to the riddle may well be found and the key may well lie in Southport.

You will be there—of course.

WRA

MGA CHAIRMAN ON TELEVISION : THIS WEEK

Mr. G. V. Allen, Chairman of the MGA, is to appear in the B.B.C. television programme, "Mainly for Women," at 3 p.m. on Thursday, 5th September.

Mr. Allen, who will be interviewed by Miss Joan Gilbert, will give some useful advice in his talk entitled "Grow your own mushrooms." Members may perhaps wonder why the chairman of a producer organisation is to give encouragement to the public to produce their own mushroom, "but," says Mr. Allen, "we were invited to give this talk which was to be given anyway and I think it is a good thing that a member of the MGA should give it and that the Association should also have been consulted on the matter." Mr. Allen is due to be on the screen for about eight minutes.

WAGES GOING UP

Subject to final ratification, agricultural and horticultural workers are to receive a substantial increase in wages as from the week commencing 29th October next. The basic rate for male workers goes up from £7 1s. to £7 10s.

The main increases proposed by the Agricultural Wages Board for workers in England and Wales, for a 47 hour week, are :—

Male workers	(Minimum rates)	Female Workers	(Minimum rates)
20 and over	150/- per week	21 and over	114/- per week
19—20	120/- " "	18—21	106/- " "
18—19	109/- " "	17—18	89/- " "
17—18	95/- " "	16—17	77/- " "
16—17	80/- " "	15—16	61/- " "
15—16	70/- " "		

There are increases in the rates for part time and casual workers, holiday remuneration and so on.

Copies of the full proposals may be obtained from The Secretary, Agricultural Wages Board, 5/8, St. Andrew's Place, London, N.W.1.

MORE PUBLICITY CONTRIBUTIONS

Latest publicity fund contributions (to 20th August) are:—

*†Spawn Merchants:— £ s. d.

Monlough Food Production Co. Ltd., Ballygowan, Belfast.

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*Previous contributions already acknowledged

*†Amounts collected by spawn merchants are not for publication.

MYCOLOGISTS HONOURED

Professor Roger Heim, honorary president of our 3rd International Conference in Paris, Dr. John Ramsbottom and Professor Johanna Westerdijk were among a dozen scientists on whom honorary doctorates in the special Linnaean group were conferred during the celebrations at Uppsala, Sweden, marking the 250th anniversary of the birth of Linnaeus. It is to Carl Linnaeus that naturalists owe the definition of genera and species and the uniform use of specific names.

THERMAL DEATH TIMES FOR SOME PESTS OF THE CULTIVATED MUSHROOM

(*AGARICUS CAMPESTRIS* L.)

Dr. E. B. Lambert and Dr. T. T. Ayers*

Abstract

Most mushroom pests were killed by exposure to a moist heat of 130° F. for 16 hours, 140° for 6 hours, or 150° for 4 hours. Exceptions are Papulaspora byssina, Chaetomium spp., and Diehliomyces microspora. The thermal death times reported do not apply to pests under dry conditions, since several of the organisms were more easily killed with heat under moist conditions than when dry. When heat is used as a practical pest-control measure the length of the heating period probably should be increased to insure against the presence of resistant strains of the pests.

More than 30 pests of cultivated mushrooms must be controlled before a grower can obtain high yields. These pests may be present in a variety of forms, such as pathogenic fungi, weed moulds, flies, mites, or nematodes. Most of them increase rapidly during the cropping period. Therefore, the problem becomes more serious with each succeeding crop unless the grower is successful in drastically reducing the number of pests on his premises at the end of a cropping period or before the next crop is begun. Fungicides and insecticides are helpful in controlling pests, but the most effective control measure available to the grower is heat in the form of live steam. Casing soil is usually heated to about 212° F., compost is pasteurized at temperatures between 120° and 160°, spawn is grown on material that has been autoclaved at 250°, and empty houses are heated to between 130° and 150°.

In spite of these control measures pests frequently continue to reappear in the houses of the average mushroom grower. Each case of apparent reinfestation poses the question whether the pests survived the temperature used to kill them or were carried back into the house or into the sterilized soil from outside sources after the heating process was finished. To answer this question a precise knowledge as to the thermal death times of all mushroom pests is needed. Literature on this subject is scattered and fragmentary. Because of this we have felt the need for summarizing briefly the previous studies along these lines and for repeating the determination of the thermal death times of some of the most important fungus pests.

Killing Mushroom Flies, Mites, and Nematodes with Heat

Although we did not test the thermal death times of animal pests, we give a short review of the relevant literature as a basis for including them in the consideration of the feasibility of controlling all mushroom pests with heat.

As early as 1906 Newstead (14) recommended heat for the control of eelworms infesting mushroom casing soil.

*Principal Pathologist and Associate Pathologist, respectively, Horticultural Crops Research Branch, Agricultural Research Service, United States Department of Agriculture.

In 1912, Popenoe (16) discussed the possibility of killing mushroom flies and mites with heat, but recommended a temperature of 150° F., which was shown by later studies to be much higher than necessary. In 1930 Gahm (6) showed that adult mites were killed in manure heated to 101° F. for 1/2 hour. At about the same time Thomas (20, 21) pointed out that all insect pests are killed in the interior of beds heated to 130° during pasteurizing. In 1938 Davis (5) stated that "a temperature of 120° to 125°, if maintained for a few hours, should effectively rid the room of all insect and mite pests." Recently Cairns (4) showed that the most resistant stages of mushroom spawn nematodes are killed by exposure to moist heat at 122° for 3 hours and to dry heat for 5 hours.

It would appear from these studies that mushroom mites, flies, and nematodes in all stages are killed by exposure to a moist heat of 130° F. for a few hours. This places them in a group of pests comparatively easy to kill with pasteurizing temperatures.

Materials and Methods

Our tests dealt with the nine fungus pests for which data on thermal death times appear in Table 1. Most of these fungi are well-known to persons interested in mushroom research and already have been described in some detail. Therefore, it hardly seems necessary to describe our cultures of *Dactylium*, *Geotrichum*, *Papulaspora*, *Scopulariopsis*, *Mycogone*, and *Verticillium*.

Our studies of the "yellow moulds" were made with isolates that appear to be the species designated by Gandy (8) as YM1 and YM2. As far as we are aware, the thermal death curves of the other yellow moulds have not been determined.

The *Trichoderma* culture used in our studies is probably of the species studied by Sinden and Hauser (19), who referred it to *Trichoderma koningi* Oudem. and named the disease "Trichoderma mildew." This fungus is a vigorous pathogen that spreads rapidly from one mushroom to another over the surface of the bed. We did not study the slow-spreading *Trichoderma* sp. that appears as greyish-green patches on the surface of acid casing soils or soils containing pieces of undecomposed roots. This is presumably the *Trichoderma* sp. studied by Beach (3) and Anderson (1).

Most of our tests were made by growing the organisms on potato-dextrose agar slants in test tubes. Entire tubes were subjected to heat by placing them in a moist chamber within an incubator. Each test was made for 2, 4, 6, 8, 10, and 16 hours. When placed in the incubator the tubes probably took about 15 minutes to reach the desired temperature and a like time for the temperature to come down to room temperature after removal. Each test was replicated 6 to 10 times. Altogether about a thousand cultures were tested.

Considerable care was taken to maintain a moist atmosphere around the spores in all tests except those in which we desired to contrast the thermal death times under moist conditions with those in a dry atmosphere.

The yellow moulds did not produce thick-walled spores in our agar cultures. Therefore, all tests with these moulds were repeated with thick-walled spores formed by the large-spored yellow moulds growing on composted horse manure. After these spores were heated they were picked off of the compost with a sterile needle and transferred to test tubes of agar. There was some contamination, but usually 8 or 9 tubes out of 10 were pure cultures.

Experimental Results

The thermal death times reported previously by other workers and those indicated by our tests are shown in Table 1. From this Table it is apparent that our findings, except those for the yellow moulds, are approximately in agreement with those of previous investigators. There is a widespread belief that a temperature of 160° F. is necessary to kill yellow mould (10, 18). Our experiments confirmed this with dry spores but not with moist spores.

Our tests were made with the species having large echinulated spores and also with the species with large smooth spores. Under moist conditions spores of these fungi, both from agar cultures and on compost, were killed by prolonged exposure to 130° F., and by exposure to 140° for 2 hours. Under dry conditions these species withstood temperatures 20° higher than under moist conditions.

Discussion and Conclusions

In recent years it has become increasingly apparent that mushroom growers can eliminate most of the important pests from their houses by controlling the air and bed temperatures during pasteurizing. There is however, still some uncertainty about the minimum temperatures and shortest time of exposure required to kill the different types of pests.

The experimental data reviewed in this paper should help to establish these thermal death times. Because most of the laboratory tests were made with only a small number of isolates, it seems likely that an occasional strain of the different mushroom pests will be encountered in mushroom houses that is more resistant to heat than the organisms tested. To insure against the survival of such heat-resistant pests we suggest that growers prolong the killing temperatures during pasteurizing or in empty houses for a period twice as long as was found necessary in laboratory experiments.

According to this rule of thumb a temperature of 130° F. maintained for 32 hours under moist conditions should be sufficient to kill all pests except brown plaster mould, *Trichoderma* mildew, olive mould, and the truffle disease fungus. Likewise, holding a temperature of 140° for 12 hours or 150° for 4 hours should kill all pests except the truffle fungus. It must be clearly understood, however, that these suggested thermal death times apply only to moist conditions. To kill dry fungus spores may require a temperature 10° or 20° higher or a longer exposure to high temperature.

Table 1. Temperature and number of hours required to kill pathogens and competitors of the cultivated mushrooms under moist conditions

Pathogen or competitor (disease)	Current investigations				Investigator (reference)	Previous findings Temperature (°F.) and period for killing
	122°	131°	140°	149°		
<i>Chaetomium olivaceum</i> Cooke & Ellis (Olive mould)	—	—	—	—	Beach (3) Anderson (1)	140° for 6 hours 122° for 20 hours; 140° for 16 hours (wet spores)
<i>Dactylium dendroides</i> Fries (Soft mildew)	4	4	2	2	Beach (3) Anderson (1) Gandy (7)	115°—120° for 24 hours 122° for 1/2 hour wet spores) 120° for 24 hours (steam and formalin) (spores on agar plates)
<i>Diehlomyces microspora</i> (Diehl & Lambert) Gilkey (Truffle disease)	—	—	—	—	Lambert (12) Kligman (9)	<i>Not killed</i> in 5 hours at 180° <i>Not killed</i> in 5 hours at 180° 180° for 7 hours
<i>Geotrichum</i> sp. (Lipstick mould)	16	10	6	4	Sinden (17) Anderson (1)	140° for 1 hour; 131° for 36 hours 122° for 1 hour; 140° for 1/2 hour (wet spores)
<i>Myceliophthora</i> sp. (False mat or YMI of Gandy)	16	16	2	2		
<i>Myceliophthora</i> sp. (Mat disease or YM2 of Gandy)	16	6	2	2	Manns (13) Anderson (1)	<i>Not killed</i> in 3 hours at 140° 122° for 1 hour; 140° for 1/2 hour (wet spores)
<i>Mycogone perniciosa</i> Magnus (Bubbles)	4	4	2	2	Beach (3) Lambert (11) Gandy (7)	115°—120° for 24 hours 106° for 6 hours 120° for 24 hours (steam and formalin) (spores on agar plates)

For purposes of practical consideration the pathogens and competitors of the cultivated mushroom seem to fall naturally into four groups:

1. Those killed by 4 hours' exposure to 130° F.: flies, mites, nematodes, and other animal pests and the fungi and bacteria causing brown blotch, bubbles, white plaster mould, soft mildew, mummy disease, and bacterial blotch.
2. Those killed either by a 16-hour exposure to 130° F. or by 6 hours at 140° the yellow moulds (YM1 and YM2), lipstick mould, brown plaster mould, *Sporotrichum* mould, olive mould, and *Trichoderma* mildew.
3. Those killed by 5 hours at 180° F.: truffle disease fungus.
4. Those with undetermined thermal death times, such as the organisms causing bacterial pit and La France disease, *Coprinus* spp., *Fusarium* spp., small-spored yellow moulds, and several minor pests.

During the past 10 years there has been a noticeable increase in the average yield per square foot obtained by progressive mushroom growers. In our opinion a large part of this increase was due to better

pest control through improved pasteurizing schedules and the use of steam with formaldehyde for heating and fumigating empty houses. Undoubtedly, there is room for further improvement along these lines in many mushroom plants, but we feel it is beyond the scope of this paper to discuss the problem in detail.

Pathogen or competitor (disease)	Current investigations Hours at °F.				Investigator (reference)	Previous findings Temperature (°F.) and period for killing
	122°	131°	140°	149°		
<i>Papulaspora byssina</i> Hots. (Brown plaster mould)	16+	16+	4	4	Beach (3) Anderson (1)	140° for 6 hours 122° for 2 hours (wet spores)
<i>Pseudomonas tolaasi</i> Paine (Bacterial blotch)	—	—	—	—	Paine (15)	124° for 10 minutes
<i>Scopulariopsis fimicola</i> (Cost. & Matr.) Arn. & Barthelet (White plaster mould)	6	2	2	2	Beach (3) Anderson (1)	115°—120° for 24 hours 122° for 1/2 hour (wet spores)
<i>Sepedonium</i> sp. (Sepedonium mould)	—	—	—	—	Anderson (1)	122° for 1 hour; 140° for 1/2 hour (wet spores)
<i>Spicaria</i> sp. (? Vern Astley disease)	—	—	—	—	Anderson (1)	122° for 1 hour; 140° for 1/2 hour (wet spores)
<i>Trichoderma koningi</i> Oudem. (Trichoderma mildew)	16+	16+	4	4		
<i>Trichoderma koningi</i> Oudem. (? Green mould)	—	—	—	—	Beach (3)	115°—120° for 24 hours
<i>Trichoderma viride</i> Pers. (Green mould)	—	—	—	—	Anderson (1)	122° for 2 hours; 140° for 1/2 hour (wet spores)
Unknown (Mummy disease)	—	—	—	—	Tucker and Routien (22)	Infested soil in drying oven at 131° for 2 hours; steamed at 212° for 1 or 2 hours; auto- claved for 20 minutes at 15 pounds pressure
<i>Verticillium malthousei</i> Ware (Brown blotch)	—	—	—	—	Ware (23) Gandy (7) Anderson (1)	104° for 6 hours 120° for 24 hours (steam and formalin) (spores on agar plates) 122° for 2 hours; 140° for 1/2 hour (wet spores)
<i>Verticillium psalliotae</i> Treschow (Brown blotch)	6	4	2	2		
<i>Verticillium</i> sp. (Brown blotch)	—	—	—	—	Beach (3)	115°—120° for 24 hours

Literature Cited

1. Anderson, F. A. 1956. Effect of temperature on spore survival of fungus pathogens and competitors of the cultivated mushroom *Agaricus campestris* L. M. S. thesis. The Pennsylvania State University.
2. Anon. 1956. Mushroom house cleanout problems discussed in growers' meeting. American Mushroom Institute News 2 (3): 5-7.
3. Beach, W. S. 1937. Control of mushroom diseases and weed fungi. Pennsylvania Agr. Exp. Sta. Bull. 351. 32 pp.

4. Cairns, E. J. 1954. Relationship of the environmental moisture conditions of the mushroom spawn nematode, *Ditylenchus* sp., to its control by heat. *Mushroom Science* II: 161-164.
5. Davis, A. C. 1938. Mushroom pests and their control. U.S. Dept. Agr. Circ. 457. 21 pp.
6. Gahm, O. E. 1930. The mite, *Linopodes antennaeipes* Banks, as a pest of cultivated mushrooms, with preliminary tests toward control. *Jour. Econ. Ent.* 23: 744-747.
7. Gandy, D. G. 1954. Microbiology Department (Disease Experiments) Mushroom Research Station Report for year 1953: 31-37.
8. Gandy, D. G. 1955. Microbiology Department (yellow moulds) Mushroom Research Station Final Report 1954: 24-32.
9. Kligman, A. M. 1944. Control of the truffle in beds of the cultivated mushroom. *Phytopathology* 34: 376-384.
10. Kligman, A. M. 1950. Handbook of Mushroom Culture. J. B. Sayne, Kennett Square, Pennsylvania 250 pp.
11. Lambert, E. B. 1930. Studies on the relation of temperature to the growth, parasitism, thermal death points, and control of *Mycogone perniciosa*. *Phytopathology* 20: 75-83.
12. Lambert, E. B. 1932. The truffle disease of cultivated mushroom. Newsletter, Div. of Mycol. & Plant Dis. Survey, B.P.I., U.S. Dept. Agr.
13. Manns, T. F. 1947. The vert-de-gris disease of the cultivated mushroom occurring in the United States. *Plant Dis. Repr.* 31: 417-418.
14. Newstead, R. 1906. A large crop of mushrooms destroyed. *Quarterly Journal of the Institute of Commercial Research in the Tropics, Liverpool University* 1: 22-23.
15. Paine, S. G. 1919. Studies in bacteriosis II. A brown blotch disease of cultivated mushrooms. *Ann. Appl. Biol.* 5: 206-219.
16. Popenoe, C. H. 1912. Insects injurious to mushrooms. U.S. Dept. Agr. Circ. 155. 10 pp.
17. Sinden, J. W. 1951. *Sporendonema* or red *Geotrichum*. *Mushroom Growers' Association Bull.* No. 22: 40.
18. Sinden, J. W. 1955. Disease control and sanitation programme for mushroom nurseries. *Mushroom Growers' Association Bull.* No. 71: 832-841.
19. Sinden, J. W., and E. Hauser. 1954. Nature and control of three mildew diseases of mushrooms in America *Mushroom Science* II: 177-181.
20. Thomas, C. A. 1931. Mushroom insects—their biology and control. *Pennsylvania Agr. Exp. Sta. Bull.* 270. 42 pp.
21. Thomas, C. A. 1942. Mushroom insects—their biology and control. *Pennsylvania Agr. Exp. Sta. Bull.* 419. 43 pp.
22. Tucker, C. M. and J. B. Routien. 1942. The mummy disease of the cultivated mushroom. *Missouri Agr. Exp. Sta. Res. Bull.* 358. 27 pp.
23. Ware, W. M. 1933. A disease of cultivated mushrooms caused by *Verticillium malthousei* sp. nov. *Annals of Botany* 47: 763-785.

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Do you want to get away from it all? Are you fed up with the strikes by the Covent Garden men, the dockers and all the others who seek to run this country by force allied to blackmail? Do you resent the heavy taxation, the high cost of fuel both solid and liquid, the rise in electricity charges, in wages? Do you look with suspicion on the proposed European free market and with dismay on the lack of support for horticulture?

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WORLD'S PRESS DIGEST

The market can stand so much "junk" and no more. A surplus of junk only tends to demoralize the market and help lower the price of good stuff. It should stand to reason that junk has no place but in the stump pile. It will make the industry much more money there than if put anywhere else. Editorial in *AMI News*, June/57.

There were many heat-wave victims on the wholesale market, but mushrooms and flowers took a knockout battering. Prices have fallen as low as 1s. lb. and the only solid buyers have been the canners.

Commercial Grower, July 5/57.

Large quantities of mushrooms on the markets have naturally pulled down the price, but it is chiefly quality, and the lack of interest on the part of the housewife, which is making the price low Retailers now want only something that is tight and will keep for a day or two One salesman suggested that mushroom growers should get on with all their odd jobs during the hot period like this, and not bother about sending any quantity to market. *Grower*, July 6/57.

Mushroom trade improves with lighter arrivals this week. *Fruit Trades' Journal*, July 13/57, and July 20/57. Mushroom trade this week is extremely poor, and heavier arrivals meet with a slow demand. *Fruit Trades' Journal*, July 27/57. Mushroom consignments were too heavy for the demand. *Nurseryman & Seedsman*, August 1/57.

The 140 members of PPDA have subscribed £7,000 for a two-year publicity programme for pre-packs, to be spent on behind-the-scenes activities to encourage consumer interest, in the manner successfully employed by the MGA. *Commercial Grower*, Aug. 16/57.

Mushrooms are not really so difficult to grow, but they do need a little skill and judgment, with some knowledge of the technique.

Percy Dyer in *Bolton Journal* series, July 26/57.

Nematode control by ethylene dibromide in a fine sandy soil was studied by laboratory and greenhouse methods. The addition of 5% steer manure or 5% oak leaf mould to the soil caused a considerable decrease in root-knot nematode control.

C. A. I. Goring & C. R. Youngson in *Soil Science*, 83, May/57.

Good control of parasitic nematodes on maize was obtained by soil fumigation with Dowfume MC2 (98% methyl bromide+2% chloropicrin) or DD, but not by Dowfume W-85 (ethylene dibromide). J. Y. Oakes, C. N. Bollich, D. R. Melville, M. J. Fielding and J. P. Hollis in *Plant Diseases Reporter*, 40, 1956.

Houseflies have been increasingly resistant to organic phosphorus insecticides following the use of parathion, Diazinon and Resistox over a period of three years. J. Keiding in *Science*, 123, 1956.

Details are given of a method of compounding satisfactorily an aqueous pesticidal spray containing the zinc salt of ethylene bis-dithiocarbamic acid with an emulsion concentrate of DDT.

Rohm & Haas Co. B.P. 757, 750, June/54.

The early identification of incipient troubles in the mushroom house is of fundamental importance. The preparation and publication of a series of Advisory Leaflets, dealing separately with the more important mushroom pests and diseases, would well serve the mushroom industry. Martin D. Austin in *Commercial Grower*, July 5/57.

The NFU has decided not to go on with the plan for a voluntary marketing organisation that was proposed by a working party.

Grower, July 27/57.

"Genal," a general disinfectant which is completely soluble, is recommended at 0.2—0.3% as a dip to disinfect picking baskets and to wash floors around the plant, at 0.3% as a dip for rubbers and shoes of workers, and at 0.5% as a deodorant around ditches and run-offs from manure piles. Stoller Co's. *Growers' Research Bulletin* 3 & 4,

March-April, 1957.

"Sol-humus" is an activator for composts and a nutrient for mushrooms, sprayed on the compost pile at the second or third turning, or just before filling. The microbes in the compost get a quick source of energy, so the compost gets hotter and the whole composting is thorough. Any shortages in catalytic trace elements is corrected. Later, the humic acids and trace elements serve as valuable nutrients for the mushrooms.

Advertisement in Stoller Research Co's. *Growers' Research Bulletin*, 3 & 4, March-April/57.

A small but significant pointer to the enterprise on the Royal Estate at Sandringham is the recent mechanization of the garden cultivations and the growing of mushrooms as a profitable sideline.

Agriculture, July/57.

Originally designed as a grain conveyor, the Mayrath Auger Conveyor has turned out to be extremely versatile. It can be a time-saver on the nursery where it can speed up the movement of coal, coke or boiler fuel to the glasshouse heater. Distributors are Gordon Felber & Co. Ltd., Spirella House, Oxford Circus, London, W.1.

Nurseryman & Seedsman, July 4/57.

"Probability & Scientific Inference," by G. Spencer Brown, is a book which had been eagerly awaited since its author first suggested three years ago that something was amiss in our scientific statistical calculations. Now he gives in detail the analysis of what is wrong and the remedies to put it right. Advertisement in *Nature*, July 6/57.

Although the use of antibiotics for food preservation is not yet permitted in this country, the Pfizer organisation at Folkestone is busily engaged on testing its own formulation of oxytetracycline for this purpose.

Commercial Grower, July 19/57.

Shortage of tinplate is keeping the brakes on private can-making Five manufacturers of glass containers added 7½ per cent. to their prices on 24th June.

Packaging News, July/57.

Most authorities look upon *Botrytis* as being only weakly parasitic and primarily saprophytic. In other words, this disease has a limited

ability to attack living tissue and grows mainly upon dead vegetable matter *Botrytis* (with the tomato crop) is invariably a serious problem where stagnant conditions prevail for even a few hours in the 24. Conversely, plants growing under conditions of free air circulation at all times are virtually untroubled.

Frank Allerton in *Nurseryman & Seedsman*, July 18/57.

Black polythene film was used last season as a lining by growers who take a winter crop of mushrooms from their glasshouses.

Henry R. Spice at Wisley, reported in *Grower*, July 13/57.

Stem eelworms exist in the daffodil bulb in three forms, and the time taken to kill them varies accordingly. Firstly, there are the eggs, which are killed in four minutes when the temperature reaches 110° F. Then there are the active eelworms, which need 17 minutes ; and finally there is the eelworm wool, which is the most resistant stage and takes 78 minutes.

John Wistow in *Grower*, July 13/57.

From a study of mushroom packages in a Wilmington, Delaware, supermarket chain, the odds are 19 to 1 there is a real difference in consumers' acceptance of the pint pulpboard box as compared with folding tray, the multi-coloured window box, or the three-pound basket.

AMI News, June/57.

The American Mushroom Institute will establish associate membership within a few weeks. Dues have been set at 100 dollars (about £35) a year.

AMI News, June/57.

Growers by the score are contaminating one another by handling overloaded trucks of spent compost all over the area, spilling and scattering harmful spores at every turn and stop sign. There is no need for overloading till it spills over the sides. And a cover could be applied. Don't be surprised if in the not too distant future all growers are compelled to steam their houses before emptying.

Walter L. Gmuier in *AMI News*, June/57.

"Heavenly Mushrooms" is now the registered trademark of the American Mushroom Institute.

AMI News, June/57.

How many firms now engaged in pre-packing fresh fruit and vegetables are really able to show any profit out of their enterprise? With our close contacts throughout all sections of the trade, we can give the answer as very few indeed It's going to be a hard, long road before this new form of marketing will emerge as an accepted ancillary to the industry.

Fruit Trades' Journal, July 13/57.

The statement in a magazine recently—a trade magazine which should know better—that no-one in prepacking is making a profit can be laughed out of court.

Produce Packaging, August/57.

Prepack corner at the Royal Show has shown the green light for the horticultural industry to go ahead with this young branch of the business.

D. Roy Mills in *Grower*, July 13/57.

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Sales INCREASE

● HERE IS ONE OF THE REASONS WHY—

From : Capt. A. Sanford,
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J. E. R. Simons Ltd.,
Natts Farm,
Harlow.

Dear Sirs,

Seeing the reports of various Mount users in your adverts in the Bulletin from time to time, I thought you would be interested to know of my own results.

You will be aware that I have now spawned regularly with your Mount White, both Moist and Granular, for close on two years and during this time have used many hundreds of cartons. We grow in the standard Danish fish box (composted stable manure) and crop for six weeks. Over a period of twelve months we have averaged 1.9 lb. per sq. ft., several crops exceeding 2 lb., and latterly it has been the exception rather than the rule to crop less than 2 lb. In fact our best crop recently has done $2\frac{3}{4}$ lb. As a point of interest, this has occurred since we adopted your suggestion of spawning with 25% of your White Grain, in addition to the Moist White manure spawn.

An outstanding feature of our cropping has been the really excellent quality of mushroom produced. We are delighted with the results and you may use this tribute as you wish.

Yours faithfully,
(signed) A. Sanford.

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Prepacks came in for special mention on the BBC television programme following Mrs. Frances Perry's visit to the Royal Show, and a number of tomato, mushroom, cucumber and cauliflower prepacks were displayed. *Fruit Trades' Journal*, Aug. 3/57.

Griseofulvin showed considerable promise for the control of *Botrytis* diseases.

A. Rhodes, R. Crosse, R. McWilliam, J. P. R. Tootill, and A. T. Dunn in *Annals of Applied Biology*, 45 (1), 1957.

Pure culture mushroom spawn should not require a phyto-sanitary certificate, it is suggested in the second report issued by the working party in Phyto-sanitary regulations for the European and Mediterranean Plant Protection Organisation. *Grower*, August 3/57.

To-day is indeed the severest of all tests towards the survival of the fittest. Look ahead—Euromarket? Channel Tunnel? Could it be that far the most potentially serious threat to home-grown produce, including mushrooms, is this prospect of a Eurotunnel?

Martin D. Austin in *Commercial Grower*, July 5/57.

References:

- Agriculture*, H.M.S.L., York House, Kingsway, London, W.C.2.
AMI News, 20 West State Street, Avondale, Pennsylvania, U.S.A.
B. & G. Review, 27 St. James Street, Covent Garden Market, London, W.C.2.
Biological Abstracts, University of Pennsylvania, Philadelphia 4, Pa., USA.
Business, 109/119 Waterloo Road, London, S.E.1.
Commercial Grower, 154 Fleet Street, London, E.C.4.
Digest of Equipment, 3 Cranston Drive, East Didsbury, Manchester 20.
Food Investigation, H.S.M.O., York House, Kingsway, London, W.C.2.
Fruit Trades' Journal, 6/7 Gough Square, Fleet Street, London, E.C.
Grower, 49 Doughty Street, London, W.C.1.
Horticultural Abstracts, Commonwealth Agricultural Bureaux, Farnham Royal.
Mushroom News, W. Darlington & Sons Ltd., Southcourt Road, Worthing, Sussex.
Nature, Macmillan & Co. Ltd., St. Martin's Street, London, W.C.2.
Nurseryman & Seedsman, 62 Doughty Street, London, W.C.1.
Phytopathology, Monumental Printing Co., Baltimore, Maryland, USA.
Produce Packaging, Agriculture House, Knightsbridge, London, S.W.1.
Soil Science, The Williams & Williams Co., Baltimore 2, Maryland, USA.
Transactions of the British Mycological Society, Cambridge University Press, Bentley House, London, N.W.1.

If the journals referred to are generally available, they are most easily obtained by placing an order with your bookseller or stationer.

MARKET PICKETS FINED

At Bow Street on 9th August, five Covent Garden market pickets were each fined £10 for stealing two chips of mushrooms belonging to a Covent Garden firm.

Mr. G. J. Black, prosecuting, said the mushrooms were taken from a lorry on Waterloo Bridge and were thrown into the Thames. The lorry was forced to stop by a car from which five men emerged and surrounded the lorry.

In finding the men guilty the chief metropolitan magistrate, Sir Laurence Dunne, said the pickets were prepared to take any steps to prevent lorries reaching the market. Taking the mushrooms from the lorry was stealing.

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AN IMPROVED TEST FOR NEMATODES IN THE SOIL

By DR. B. B. STOLLER

According to a recent article in Agricultural and Food Chemistry (1) (U.S.A.), "Nematodes destroy an estimated 10% of the nation's crop annually." So it is to be expected that considerable effort would be spent in developing tests for detecting, separating and concentrating nematodes in the soil.

Quite a few tests involving diverse kinds of funnels and filtration devices have been published in recent times. It will suffice, however, to mention the latest device by Miller (2). While Miller's method is inexpensive and simple, it does have certain disadvantages. The "Plastic Tube" method to be described herein, like Miller's, utilizes facial tissue as the filtering medium. But the "plastic tube" method does have some distinct advantages; a comparison of some of these are:

	Miller's	"Plastic Tube"
1. Size of sample of soil tested.	Limited to 5 oz. paper cup.	Capacity of funnel is 16 oz.
2. Concentration of Nematodes.	In 15 ml. of water.	In 5 ml. of water or less.
3. Storage of nematode sample.	5 oz. paper cup, and water lost by evaporation.	Constricted $\frac{1}{2}$ " plastic tube, and no loss by evaporation.
4. Cost of materials per test.	About 4c.	About 2c.

Like all tests for nematodes the principle is the same: Nematodes eat through the tissue containing the soil, and sink down in water which is in the plastic tube.



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and Worthing*

An assembly and lay-out of the parts for this method is shown in the accompanying picture. (The complete kit, containing 2 funnels, 50 plastic tubes, 2 aluminum screens, rod, screws, wire and rubber bands, may be purchased from Stoller Research Co., P.O. Box 1071, Santa Cruz, California, for \$3.75 post paid).

The novelty of this method is the use of Plastic Tube. These tubes are made of polyethylene, 0.002 inches thick. The tubes are 9 inches long, have a width when flat of one inch or $\frac{1}{2}$ " in diameter, and are sealed at one end. The thin plastic sheeting prevents the escape of moisture, but allows an exchange of the respiratory gases. Accordingly, the nematodes remain alive in the water at the end of the tube; in contrast, the nematodes are dead or 'inactivated' when rubber tubing is used for a similar purpose. Other advantages in the use of plastic tubing compared to rubber tubing are that: sediment can be observed, the end of the tubing can be opened completely after constricting, constrictions can be made at several places up the plastic tube for daily observations, and the constricted end of the tube with the nematodes can be very conveniently stored for later observation.

There is no simple, fast test for mould spores, mites, etc., in the soil—except for nematodes. In most cases, if the nematodes are destroyed so are other pests. So the nematode test, for all practical purposes, can serve as a sterility test.

Good practice is to know the results of tests right away. For example, during the sweating out of a house a grower can tell within 24 hours whether his peak heating eliminates nematodes and other pests. If the heat was insufficient more can then be introduced.

In careful tests for nematodes I have found that ALL nematodes are eliminated in the compost ONLY after peak heating the compost at 140° F. for twenty-four hours.

PROCEDURE FOR MAKING TEST

1. Fasten a plastic tube to the spout of funnel by twisting a rubber band 3 or 4 times. (Plastic tube may be bent while twisting rubber band.)
2. Screw the screw-type holder into a wood stand or otherwise, and insert the funnel with tube attached.
3. Fill plastic tube with water and see that there is no leak. Insert aluminum wire screen into funnel, and fill funnel with water just to surface of screen. Then take a "double" sheet of facial tissue (Scotties, Kleenex, etc.), and push the tissue down until it touches the wire screen—water should not touch the tissue. Insert aluminum rod between the tissue and the side of the funnel, down to the screen.
4. Fill soil to about top of funnel. The tissue hanging over side of funnel can be turned to cover the soil; add a few drops of water to hold tissue down.
5. Push the tissue and soil away from the side of the funnel with the rod, and then pour water in the space created by pushing with the rod. Add water slowly as the soil absorbs, and continue until free

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water comes to the top of funnel. In this way, no soil particles fall into plastic tube, so the water in the tube remains clear.

6. Incubate at room temperature or 70° F. for 24 to 48 hours. (Longer to allow cysts to hatch).

7. To observe for nematodes twist a piece of stainless wire around the tube $\frac{1}{2}$ " to 1" from the bottom of the tube. Then cut open constricted end of tube and empty contents into a glass dish. (The plastic tube can be re-used by fastening the open end with a band.)

Literature Cited:

1. Anon. 1957. Nematode Control. Agricultural and Food Chemistry 5: 159-160.
2. Miller, Patrick, M. 1957. Cheap, disposable filters for nematode surveys. Plant Disease Reporter 41; 192.



COPENHAGEN, 1959

The Fourth International Conference on Mushroom Science will be held in Copenhagen, Denmark, from 18th to 25th July, 1959.

The initial plans were made at the recent meetings of the Standing Committee in Brussels and Copenhagen. The Conference will consist of papers read under three sections: Fundamental research, applied research, and growers' problems. About one-and-a-half days will be devoted to each section, and at the end of each day films of mushroom interest will be shown.

Mushroom farms in Denmark and Sweden will be visited at the close of the conference proper. There is to be a novel competition for the best photographs of any aspect of the mushroom industry; these pictures should form a fascinating exhibition.

On 18th June, the Standing Committee (Mr. Fred. C. Atkins, President; Dr. P. J. Bels, Secretary) formally handed over responsibility to the Danish Organizing Committee, comprising initially: Professor H. K. Paludan, President; Dr. Cecil Treschow, Vice-President; Mr. C. Riber Rasmussen, Secretary; and Messrs. Peter Jørgensen, E. Randløv, A. Klougart, P. Nørgaard, L. P. Sørensen, E. Fladeland Nielsen, M. G. Amsen, Jørgen Poulsen, E. Pallesen, AA. Killemoes.

Fuller details will be published in the *MGA Bulletin* from time to time. In the meanwhile, please note the date in your diaries.

Apologies to Major Dredge. His yield (August Bulletin, p. 280) is $1\frac{1}{2}$ lb./ft. *excluding* stalks.

British —by Gad, Sir!

If we wished to be fashionable, we would claim that our mushroom spawn was produced from Patagonian strains, that our Spawn Research Laboratories were staffed by Tibetans, and that the scientific equipment we use was imported (at enormous cost!) from Ruritania!



We are not ashamed to say, however, that, like the Rolls Royce and the Vickers Viscount, 100% Spawn is also 100% British. Our Spawn Research and Development Laboratories are probably the most advanced in the world, and the spawn they produce is equal, if not superior, to any spawn.

A bold statement? You can put it to the test! Next time you are spawning, run 100% Spawn against *any* other brand. You will find this all-British product outstanding for yield, quality *and* reliability.

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"CRITICAL" EDITORIAL

In fairness to Mr. Toovey, Director of the Glasshouse Crops Research Institute, to whose Open Day the Bulletin was not apparently invited, I feel I should explain that I was invited as a subscriber and also, personally, as chairman of the MGA Research Sub-Committee. It might well have been assumed that, as a member of the Bulletin's Editorial Board, I was invited in that capacity also. Indeed, had I not been off that day to Copenhagen on International Conference business, I would certainly have written a report for the Bulletin.

FRED. C. ATKINS.

PUBLICITY NEWS

The MGA's publicity effort at the Tea Centre, 22 Lower Regent Street, London, from 1.30 p.m. on Monday, 9th September, until 6.30 p.m. on Friday, 13th September, entitled "101 Winning Ways With Mushrooms," looks like being an outstanding success and all members of the MGA are cordially invited to attend.

Messrs. J. E. R. Simons Ltd. supplied the mushrooms for the Lea Valley Growers' Association stand at the Royal Show and, as usual, they also supplied mushrooms for the Essex NFU Stand at the Essex County. In both cases, of course, it was Mount Mushroom Spawn and it is interesting to note that at the Royal Show, special mention was made about the quality of the mushrooms—this particular one was Mount Bekesbourne.

Incidentally, Mr. J. E. R. Simons mentioned to us the other day that, standing in front of the exhibit, it was interesting to note, although the produce on these two stands was, as always, exquisite in its quality and layout, that the number of people who apparently see mushrooms first is really amazing. Quite a number of them, after gazing at the Stand for some minutes, would exclaim, "Oh look, mushrooms!"

So once again it would seem that whenever growers can get an opportunity of showing mushrooms, even at local shows, it is really good publicity.

SOUTHPORT MUSHROOM COMPETITIONS

It is only infrequently—far too infrequently many people think—that the MGA comes north for a major activity.

The Mushroom Developments Conference at the Prince of Wales Hotel, Southport, on 2nd and 3rd October, certainly promises to be a really major activity and it is hoped that members will support this important conference in large numbers. Everyone associated with the organisation work is hoping too that full support will be accorded the mushroom competitions, especially from members in the north who, so often in the past, have complained that the southern venue for the Annual Exhibition and Conference has given growers in the south an advantage.

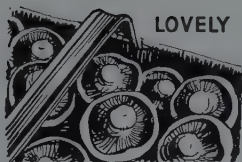
Now is your chance, northern growers. There is an entry form included in the Southport literature with this Bulletin. Fill it in now and send it to the MGA Secretary without delay.



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A quarter lb. of mushrooms contains only 8 calories! Here is a nice way to slim. Eat mushrooms raw in salads—they're delicious. FREE! Send 2d. s.a.e. for recipes leaflet to M.G.A., Agriculture House, Knightsbridge, S.W.1.



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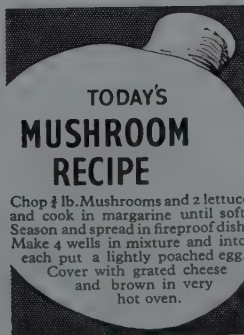
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Add raw mushrooms to salads. Mushrooms are ideal for slimming, too. Only 8 calories to the quarter lb. FREE! Send 2d. s.a.e. for recipes leaflet to M.G.A., Agriculture House, Knightsbridge, S.W.1.



TODAY'S MUSHROOM RECIPE

Chop ½ lb. Mushrooms and 2 lettuce and cook in margarine until soft. Season and spread in fireproof dish. Make 4 wells in mixture and into each put a lightly poached egg. Cover with grated cheese and brown in very hot oven.

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P. & T. Fitzpatrick Ltd., 22 Queen Square, Liverpool 1	5	5	0
Wm. Bulman & Leatherland Ltd., 30 St. Andrew's St., Newcastle-on-Tyne	5	0	0
Jackson & Lakin Ltd., Nottingham	3	5	6
Reuben Levy Ltd., 88 Spitalfields Market E.1	8	9	2

Sundriesmen, etc.:—

Thomas Elliott Ltd., Eagle Mills, New Church Road, S.E.5	10	10	0
Shirley Organics Ltd., Vicarage Wharf, Battersea, S.W.11	25	0	0
Stable Manures Ltd., Manure Dealers, Worthing and Newmarket	60	0	0

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W. Darlington & Sons Ltd., Southcourt Road, Worthing.			
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S. A. F. Sampson Ltd., Oving, Chichester.			
Geo. Monro Ltd., Hertford Road, Waltham Cross.			
Pinkerton's Scottish Mushroom Laboratories, Millerston, Glasgow.			
Agricultural & Chemical Co. Ltd., 51 Barbican, London, E.C.1.			

*Amounts collected by Spawn Merchants are not for publication.

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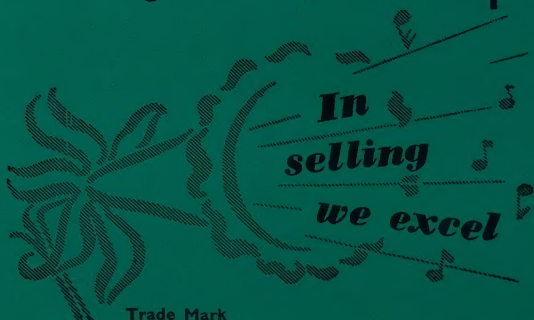
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